Performance Audit
Public Works Motor Equipment Division

February 1999

City Auditor's Office

City of Kansas City, Missouri

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Honorable Mayor and Members of the City Council:

This audit of the Public Works Department's Motor Equipment Division was initiated by the city auditor pursuant to Article II, Section 13 of the city charter. We initiated the audit because the size of the operation, complaints received by our office, and prior audit work on fire apparatus all suggested that a performance audit on the division's garage operations could identify opportunities for improvement. We focused our work on the cost, quality, and timeliness of repairs and the adequacy of management controls to safeguard assets and direct program operations.

Motor Equipment Division management is concerned about decreasing revenue and loss of business. However, while repair costs appear reasonable, management does not systematically assess the quality and the timeliness of their work. Negative perceptions of the division's competitiveness may contribute to their loss of revenue. Results of the division's 1997 user survey indicate that user satisfaction is mixed. While users rated their last experience fairly well, about a third of respondents indicated that quality and timeliness could be improved and 15 percent of respondents commented that costs are too high or are not competitive.

The cost of division repairs appears reasonable, although not necessarily always lower than the private sector. The Motor Equipment Division's labor rate and parts markup are lower than local private repair shops and many other cities. However, higher labor hours per repair may largely offset the low labor rate and parts markup. Because managers assess individual and division performance based on the amount of time charged to jobs, there may be incentives for mechanics to charge more time and supervisors to approve more time than necessary to complete a job.

Division management does not routinely assess quality and timeliness of the services it provides. The division's computerized fleet management system has the capability to track quality and timeliness, but inconsistencies in how data are entered prevent management from effectively using all of the data collected. Without good management information, the division cannot track quality and timeliness and thus may be unable to address negative perceptions or actual problems that could affect the division's competitiveness. To enhance their competitiveness, management should develop balanced performance measures to assess whether cost, quality, and timeliness are reasonable.

We found a number of weaknesses in management controls that could result in loss of city assets and unnecessary costs or delays for users. Year-end inventories for the past two fiscal years disclosed significant errors. There are no written inventory procedures and duties are inadequately segregated. Mechanics generally are not required to turn in used parts, and there are no written procedures regarding disposing of old parts. Nearly two-thirds of the inventory is obsolete, yet the division frequently special orders parts not kept on hand and mechanics and division management cite waiting for parts as a significant problem contributing to delays in completing repairs. Finally, lax physical security creates an environment where theft could go undetected. We make a number of recommendations to strengthen inventory controls and physical security.

There are no citywide policies defining operator responsibilities for vehicle maintenance. Because ownership of vehicles and delivery of fleet services are decentralized among departments, vehicles may not receive adequate maintenance and maintenance records may be incomplete. Motor Equipment Division records show that about 19 percent of the fleet, excluding Aviation, Parks and Recreation, Police, and Water department vehicles, received no preventive maintenance in fiscal year 1998. The city manager should implement an administrative regulation defining operator responsibilities for vehicle maintenance.

Finally, we found that the division has environmental policies consistent with state and federal regulations and the Office of Environmental Management provides a control to ensure compliance with those policies.

We sent the draft report to the city manager and the director of Public Works for review and comment on January 6, 1999. Their responses are appended. We appreciate the cooperation and courtesy of the Motor Equipment Division employees. The audit team for this project was Chanel Goodwin-Watkins, Douglas Jones, Edina Maltbia, Martin Tennant, Nancy Hunt, and Amanda Noble.

Mark Funkhouser
City Auditor

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Introduction

Audit Objectives

This audit of the Public Works Department's Motor Equipment Division was conducted pursuant to Article II, Section 13 of the Charter of Kansas City, Missouri, which establishes the Office of the City Auditor and outlines the city auditor's primary duties.

A performance audit is an objective, systematic examination of evidence to independently assess the performance of a government organization, program, activity, or function in order to provide information to improve public accountability and facilitate decision-making.[1] This audit was designed to answer the following questions:

- Are cost, quality, and timeliness of maintenance and repairs reasonable?
- Are management controls in place to safeguard assets, direct program operations, and ensure proper reporting?

We decided to audit fleet maintenance operations because the size of the operation, complaints received by our office, and our prior work on fire apparatus suggested that a performance audit might identify opportunities for improvement.

Scope and Methodology

The audit focuses on the Motor Equipment Division's garage operations. We did not review controls over fuel procurement and distribution or vehicle acquisition and allocation. Nor did we review the cost effectiveness of the city's multiple garage operations. We recommended that the city manager prepare a proposal to consolidate motor equipment and other activities among the Parks and Recreation and Public Works departments in our 1995 audit, *Consolidation of Selected Activities: Parks and Recreation and Public Works Departments*. Previous

[1] Comptroller General of the United States, *Government Auditing Standards* (Washington, DC: U.S. Government Printing Office, 1994), p. 14.

consultant studies have also recommended consolidating the city's fleet maintenance operations.

Our review is primarily based on data from fiscal years 1997 and 1998. We started the audit in May 1997. Audit work was halted in November 1997 due to changed priorities and resumed in July 1998.

We conducted this audit in accordance with generally accepted government auditing standards except the office has not undergone an external quality control review within the last three years[2]. Audit methods included:

- Reviewing literature related to fleet maintenance operations.
- Interviewing city staff in the Motor Equipment Division and in departments that use the division's services.
- Observing operations and physical security at the Municipal Service Center garage and satellite garages.
- Analyzing survey responses collected by the Motor Equipment Division in 1997. (See Appendix A for a description of the division's survey methodology.)
- Analyzing cost and performance data compiled in the Motor Equipment Division's GEMS 2000 system for fiscal years 1997 and 1998.
- Phoning area vendors to compare costs of selected common repairs on light equipment.

No information was omitted from this report because it was deemed privileged or confidential. During the course of the audit we identified a situation that could indicate possible illegal acts. We reported the information to the city's security manager for follow-up investigation. We do not provide details here so as not to interfere with the investigation.

[2] The last review was performed in April 1995. A peer review is planned for the current year.

Background

The Public Works Motor Equipment Division is one of the city's five garage operations, providing services primarily to the Public Works, Fire, and Office of Environmental Management departments. The Aviation, Parks and Recreation, Police, and Water Services departments each operate their own fleet maintenance units. The Motor Equipment Division serves the rest of the city and is responsible for maintaining about 1,010 vehicles and equipment.[3]

The Motor Equipment Division runs five garage shops at the city's Municipal Service Center: light equipment, heavy equipment, fire equipment, solid waste equipment, and a body shop. Two satellite garages provide maintenance support primarily to the Public Works Street and Traffic division. The division operates a storeroom. Each of the sections, except the body shop, runs two shifts. The shops are staffed from about 7:30 a.m. until midnight. Motor Equipment also operates three "trouble trucks" to serve vehicles in the field – two for Fire and one for Solid Waste. A fire trouble truck is on-call 24 hours a day.

Legal Authority

Code of Ordinances. Sections 2-1678 through 2-1682 of the Kansas City Code of Ordinances establish and define the use and resources of the public works working capital fund. The fund is intended to provide for financing operation, maintenance, and replacement of motor equipment and non-motorized construction and maintenance equipment in the custody of the Public Works Department. The fund may also be used to finance the cost of manufacture, purchase and repair of equipment, tools, commodities, and other reimbursable services rendered by Public Works to another division or department of city government.

Administrative Regulations (ARs). Two ARs address motor vehicles. AR 6-1 describes how serial numbers are to be assigned to motor vehicles and other equipment. AR 6-2 establishes procedures for the use of city-owned vehicles. City-owned vehicles may be assigned to employees who are frequently required to answer emergency calls during business and non-business hours or to an employee holding a position where need for a vehicle has been designated. Department heads are to

[3] About 12 percent of these vehicles are leased sedans and light trucks. The division provides maintenance services on leased vehicles if authorized to do so by the lessor and the leasing department brings those vehicles to them for service. Enterprise Leasing has authorized the division to perform maintenance on their leased vehicles. However, based on GEMS data from fiscal years 1997 and 1998, the division does very little work on light vehicles leased by city departments.

review vehicle assignments each month to determine whether the employees assigned a vehicle still need it. There are no citywide policies and procedures regarding operator responsibilities for vehicles.

Funding

The Motor Equipment Division operates as an internal service fund. The division charges user departments for direct labor, parts, fuel, insurance, commercial labor and parts, and overhead. An overhead rate of 25 percent is currently added to parts and commercial charges.

The division's revenues and operating expenditures have been fairly flat over the past several years, dropping in fiscal year 1998. Although revenues exceeded expenditures in three of the last six years, the division spent about $704,000 more than it took in since fiscal year 1993. The biggest difference occurred in fiscal year 1998. According to the division superintendent, revenues decreased due to reduced work on fire apparatus as the Fire Department replaced old trucks and an increase in the number of leased vehicles throughout the city. According to the budget office, operating deficits are covered by fund balance or transfers-in from other funds.

Exhibit 1. Comparison of Revenues and Operating Expenses; Fiscal Years 1993-1998

	1993	1994	1995	1996	1997	1998
Revenues	$5,680,434	$5,770,470	$5,434,182	$5,735,301	$5,959,283	$4,710,225
Operating Expenses	5,946,039	5,738,009	5,701,799	5,608,464	5,670,751	5,328,765
Difference	(265,605)	32,461	(267,617)	126,837	288,532	(618,540)

Source: GFS ASUM and RSUM tables.

The division's fiscal year 1999 budget totals about $5.8 million. The budget is based on departments' estimated fleet maintenance expenditures for the year. However, departments are not required to use the Motor Equipment Division's services or to spend money appropriated for fleet maintenance for that purpose.

Depreciation charges were eliminated with the fiscal year 1987 budget. The city no longer funds vehicle replacement on an on-going basis. In 1995, the city transferred ownership of vehicles from the Public Works Department to individual departments.

Staffing

The division is authorized 77 full time positions for fiscal year 1999. Authorized staffing has decreased 21 percent over the past six fiscal years, with the elimination of 13 mechanic and 3 supervisor positions and the net decrease of 2 support positions. The largest decrease was in the current fiscal year. As of August 1998, 70 of the 77 positions were filled, with all of the vacancies in garage operations.

Exhibit 2. Authorized Staffing; Fiscal Years 1994-1999

	1994	1995	1996	1997	1998	1999
Garage	82	79	79	79	75	64
Storeroom	15	15	15	15	15	13
TOTAL	97	94	94	94	90	77

Sources: Division budget request documents; adopted personnel budgets.

GEMS System

The division uses a computerized fleet management system called General Equipment Management System (GEMS) 2000 to track repairs, parts inventory, and billing information. The division implemented the system in 1995, when its former fleet management system failed. Due to failure of a tape back-up system, the division lost automated records prior to 1995. Therefore the current system only contains maintenance records since the system was implemented. The division is now testing its back-up system.

The GEMS system provides numerous features to track and manage the city's fleet, including optimal replacement modeling, scheduling, workflow, inventory management, billing, and management information reports.

Findings and Recommendations

Summary

Motor Equipment Division management is concerned about decreasing revenue and loss of business. However, management does not systematically assess the quality and timeliness of their work. Negative perceptions of the division's competitiveness may contribute to their loss of revenue.

We sought to determine whether cost, quality, and timeliness of maintenance and repairs are reasonable. Costs appear to be reasonable, although not necessarily always lower than the private sector. However, we were unable to conclusively assess quality and timeliness due to inconsistencies in management information. Perceptions of quality and timeliness could affect users' perceptions of cost. Without good management information, the division is unable to track quality and timeliness and may be ill equipped to deal with negative perceptions or to identify and correct problems. Results of the division's 1997 user survey indicate that user satisfaction is mixed. While users rated their last experience fairly well, about a third of respondents indicated that quality and timeliness could be improved and 14 percent indicated that cost was a concern.

To enhance their competitiveness, management should develop balanced performance measures, including ways to reliably track downtime, rework, and customer satisfaction. The division's fleet management system has the capacity to track performance. In order to take advantage of the system's capabilities, the division should implement consistent procedures for coding jobs and processing work orders.

We found a number of weaknesses in management controls that could allow loss of city assets and unnecessary costs or delays for users. Weak inventory controls and lax physical security create an environment where theft of parts could go undetected. Mechanics and division management cite waiting for parts as a significant problem contributing to delays in completing repairs. Because managers assess individual and division performance based on the amount of time charged to jobs and revenue received, there may be incentives for mechanics to charge more time to a job than necessary or to charge parts to a job that were not used. We make a number of recommendations to strengthen management controls.

There are no citywide policies defining operator responsibilities for vehicle maintenance. Because ownership of vehicles and delivery of fleet services are decentralized among departments, vehicles may not receive adequate maintenance and maintenance records may be incomplete. Motor Equipment Division records show that about 19 percent of the fleet, excluding Aviation, Parks and Recreation, Police, and Water department vehicles, received no preventive maintenance in fiscal year 1998. The city manager should implement an administrative regulation defining operator responsibilities for vehicle maintenance.

Finally, the division has environmental policies consistent with state and federal regulations and the Office of Environmental Management provides a control to ensure compliance with those policies.

Repair Costs Seem Reasonable, But Could Be Lower

The Motor Equipment Division's labor rate and parts markup are lower than local private repair shops and many other cities. Maintenance and repair costs per mile for sedans and light trucks are similar to National Association of Fleet Administrators (NAFA) benchmarks. However, higher labor hours per repair may offset the low labor rate and parts markup. While division supervisors and superintendents believe the labor hours per job are reasonable, costs are not consistently lower than private garages for several common repairs on light equipment. About 14 percent of users who responded to the division's 1997 survey identified cost as an area that the division could improve.

Labor Rate Is Low

The division's hourly labor rate of $45.50 is about 30 percent lower than the average hourly rate charged by the 7 area shops we called, and is lower than 9 of 13 comparable cities for which we had information[4]. (See Exhibits 3 and 4.) In addition, the division's parts markup is comparable to that of other cities.

[4] We used information collected by the Office of the City Auditor in Portland, Oregon. Cities were selected based on comparable population or were ranked among the best-managed cities by *Financial World*.

Exhibit 3. Labor Rates at Area Private Garages

Area Shop	Hourly Rate
Goodyear	$ 59.00
Firestone	$ 59.00
Albright-Roberts Chevrolet	$ 62.00
Courtesy Chevrolet	$ 64.00
Broome Oldsmobile	$ 65.00
Charlie Fisher Buick - Chevrolet	$ 70.00
Jay Wolfe Oldsmobile	$ 70.00
AVERAGE	$ 64.14

Source: Telephone survey (October 1998).

Exhibit 4. Comparison of Labor Rates and Parts Markup to Other Cities

City	Mechanic Labor Rate	Parts Markup
San Antonio	$ 36.00	N/R
Charlotte	$ 38.00	20%
Cincinnati	$ 42.00	14%
Dallas	$ 42.63	40%
Kansas City	$ 45.50	25%
Denver	$ 46.00	29%
Oklahoma City	$ 46.00	30%
Austin	$ 47.50	30%
Indianapolis	$ 48.00	0%
Sacramento	$ 51.85	20%
Seattle	$ 55.00	23%
Phoenix	$ 55.19	36%
Portland	$ 58.62	18%
San Jose	$ 70.00	30%

Source: *City Fleet Services: Review of Costs and Performance*, Office of the City Auditor, Portland, Oregon, March 1998, p.18.

Costs per mile for sedans and light trucks approximate NAFA benchmarks. The costs per mile for sedans and light trucks are comparable to NAFA benchmark data. The division's median maintenance and repair cost per mile for sedans and light trucks are .08 and .13 respectively, while NAFA benchmarks for these vehicles are .07 and .10 respectively. The supervisor of the light equipment shop suggested that high mileage and multiple users of light trucks contribute to the city's higher cost.

Exhibit 5. Median Maintenance and Repair Cost Per Mile by Type of Vehicle

Type	Median Cost	Number Vehicles
Sedans	0.08	227
Light Trucks	0.13	182
Heavy Trucks	0.63	84
Fire Equipment [5]	0.11	74
Solid Waste Packers	1.27	8

Source: GEMS data for fiscal years 1997 and 1998.

We were not able to find benchmark data for heavy equipment or specialized vehicles. However, since the division's labor rate for heavy equipment and specialized vehicles is the same as for light trucks and sedans, we believe the labor rate is low. Motor Equipment Division management told us that they think the maintenance and repair costs per mile seem reasonable.

Hours Per Repair May Be High

Total costs for repair work depend upon the labor rate, parts cost, indirect costs, and labor hours. Higher job hours for a repair could increase the total costs despite a low labor rate. A lack of performance measures other than the amount of time charged to jobs, could provide incentive for mechanics to charge more labor hours and for supervisors to approve more labor hours than necessary.

Labor hours are higher than private garages on some common repairs. The Motor Equipment Division's low labor rate could be offset by higher job hours per repair. We obtained price estimates from area vendors on five common repairs for three models of vehicles[6]. The Motor Equipment Division had the lowest or second lowest cost for 8 of the 15 jobs. (See Exhibit 6.) For the repairs we compared, however, the division charged an average of 0.3 more labor hours per job. The higher number of hours per job largely offsets the lower labor rate and parts mark-up. On 6 of the jobs, at least two of three vendors we called quoted a lower price than the division's average repair cost, despite the division's significantly lower labor rate.

[5] The median maintenance and repair cost for fire equipment is low because a number of new vehicles were added to the fleet in late 1997 and early 1998.

[6] We selected these jobs and models so we could calculate the average cost and labor time based on several repairs.

Exhibit 6. Cost Comparison for Selected Jobs

	Division Average Repair Cost	Vendors Quoting Lower Cost	Vendors Quoting Higher Cost
1990 Chevrolet Cavalier			
Replace Front Brake Pads	$ 76	0	3
Replace Front Brake Pads and Rotors	158	0	3
Replace 4 Tires	214	2	0
Replace Alternator	144	0	3
Replace Battery	103	1	2
1996 Oldsmobile Cutlass			
Replace Front Brake Pads	$ 83	1	2
Replace Front Brake Pads and Rotors	167	1	2
Replace 2 Tires	94	1	1
Replace Alternator	201	0	3
Replace Battery	104	2	1
1990 GMC TC10903 Pickup			
Replace Front Brake Pads	$120	2	1
Replace Front Brake Pads and Rotors	330	2	1
Replace 2 Tires	149	2	1
Replace Alternator	171	2	1
Replace Battery	92	2	1

Source: Telephone survey (October 1998).

Performance measure may influence labor hours. Division management told us that their goal is for mechanics to spend 75 percent of their time charged to jobs. They use this measure to assess both division and individual performance. In the absence of additional performance measures focusing on efficiency or user satisfaction, this goal may provide an incentive for mechanics to charge more hours to a job than necessary and for supervisors to approve more hours than necessary. Although we saw no evidence of this occurring, the system in place would allow that to happen.

Division management believes hours are reasonable. Supervisors and superintendents reviewed our analysis of the average job hours for the top 20 jobs per shop and found them generally reasonable. (See Appendix B.) They identified several factors that can increase labor hours. Too few bays in the repair shops could contribute to higher hours if mechanics need to move vehicles that are waiting for parts. The large variety of vehicles in the fleet may contribute to higher hours as mechanics do not have the opportunity to specialize in repairs or types of vehicles as they do in private shops. The age and condition of vehicles in the fleet may also contribute to higher labor hours per repair, particularly if vehicles are rusty.

Some survey respondents identified cost as a concern. In early 1997, the Motor Equipment Division conducted a user survey. Relatively few respondents addressed cost; 14 percent of the respondents commented that costs should be lower or more competitive, while no respondents identified costs as reasonable. A higher percentage of respondents from the Fire Department made negative comments about cost.

Management Does Not Routinely Assess Division Performance

Motor Equipment Division management does not systematically measure the quality or timeliness of work on city vehicles. A management information system to track vehicle maintenance, costs, and performance data is essential for a well-managed fleet. The division has an information system, which it uses to track billing and maintenance, but is not fully using its capabilities to provide management with performance information. Results of the division's user survey indicate that user satisfaction is mixed and at least some users believe that quality and timeliness could be improved.

Quality of Work Is Not Routinely Assessed

Management assesses the division's performance and individual mechanics' performance primarily based on the percentage of time charged to jobs. While supervisors periodically inspect completed repairs to assess job performance, the division does not have performance measures or goals to assess quality of work overall. The division superintendent said that he also relies on customer complaints to assess the division's performance.

Re-work measures quality of repairs. One measure of work quality is the amount of re-work performed on vehicles. Re-work is a repair that must be repeated within some defined period of time, usually 30 to 90 days. We planned to analyze re-work to assess the quality of the division's maintenance and repairs. However, due to inconsistencies in the way jobs are coded, we could not identify re-work. To approximate re-work we analyzed vehicle repairs to the same system within 90 days[7]. However, work on the same system may involve different components

[7] For our analysis, we defined re-work as work on the same vehicle and the same major system within 90 days. We developed this definition because we found that division staff did not consistently use detailed job codes. Additionally, work done on the same system, regardless of the actual problem, within a short time frame could appear to be re-work to vehicle users. We excluded preventive maintenance, vehicle preparation work, and standing by at fire scenes.

and not actually be a repeat repair. Our analysis, while inconclusive due to data limitations, is consistent with potential quality problems.

Repairs to the same system within 90-days may be high. Overall, 36 percent of the jobs performed in fiscal years 1997 and 1998 met our definition of repeat repairs to the same system. (See Appendix C.) Some of the systems with substantial repeat work within 90 days were lighting systems, hydraulic systems, brakes, tires, and batteries. The percentage of repeat work on these systems within 90 days ranged from 69 percent for lighting systems to 34 percent for batteries. All of the packers, most of the fire apparatus and heavy trucks, and about half of the sedans in the city's fleet had repairs to the same system within 90 days at least once over the two-year period. (See Exhibit 7.)

Exhibit 7. Percent of Vehicles Requiring Repairs to a System within 90 Days

Type of Vehicle	Percent
Sedans	46%
Light Trucks	68%
Heavy Equipment	91%
Fire Equipment	86%
Solid Waste Packers	100%

Source: GEMS data for fiscal years 1997 and 1998.

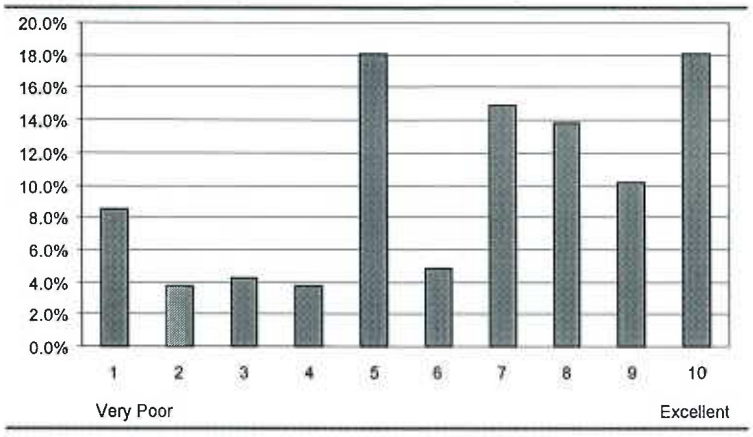
Division supervisors and superintendents said they were not surprised that there is a lot of work on lighting and hydraulic systems and that the figures seemed reasonable. Lights burn out or break often and hydraulic systems have numerous hoses subject to leaks or breaks. They further said that lighting system repairs are the most common repair in vehicle fleets. The division superintendent also said that operator use or abuse contributes to frequent work on the same system.

Division supervisors and superintendents felt that our analysis was misleading because job coding used by the staff is not detailed enough or consistent enough to properly identify re-work through GEMS data without reviewing notes on individual jobs.

Survey responses were mixed regarding quality. Respondents to the division's 1997 survey of users, provided a mix of comments regarding quality; 32 percent made comments indicating that quality could be better and 36 percent made positive comments about work quality. Some of the respondents made comments related to re-work, such as "fix it right the first time" and "make sure the vehicle is repaired before returning it." Overall, however, respondents rated their last experience at

the Motor Equipment Division fairly well. The median rating was a 7 on a 10-point scale.[8] (See Exhibit 8.)

Exhibit 8. Frequency Distribution of Last Experience Ratings



Source: Motor Equipment Division Surveys.

Timeliness of Work Is Not Routinely Assessed

Division management does not systematically measure the timeliness of the work performed by division mechanics. NAFA considers downtime an important measure of vehicle availability.[9] Our analysis of GEMS data indicated that downtime for some types of vehicles appears to be reasonable.[10]

Division supervisors and superintendents said that we could not reliably measure downtime using GEMS information because there may be paperwork delays in completing work orders, or vehicles may be used while a work order is open. Because exceptions or delays cause wide variations in performance, we used medians rather than averages to provide a more accurate picture of downtime.[11] NAFA also uses

[8] The median represents the midpoint in the data where there are an equal number of values above and below this midpoint. A rating of 1 indicates very poor and a rating of 10 indicates excellent; 26 respondents left this question blank.

[9] *Benchmarking for Quality in Public Service Fleets*, National Association of Fleet Administrators, Iselin, New Jersey, 1993, p. 5.

[10] For our analysis, we calculated hours out of service as the time between when a work order was opened and a work order was completed. We calculated downtime as the portion of hours out of service that occurred during the vehicle's scheduled shift. For currently active vehicles, we also calculated downtime as a percent of total hours the vehicle was supposed to be on duty during fiscal years 1997 and 1998.

[11] Medians are a better measure of central tendency in data ranges with extreme values.

medians to determine benchmarks because of extremes in fleet performance reported in their survey.

Downtime for sedans appears to be reasonable. Median downtime for sedans in fiscal years 1997 and 1998 was 2.5 percent. The median downtime for light trucks in fiscal years 1997 and 1998 was 7 percent. NAFA's benchmark for both sedans and light duty trucks is 2 percent. (See Exhibit 9.)

Exhibit 9. Median Percentage Downtime by Type of Vehicle

Type of Vehicle	Median	Number of Vehicles
Sedans	2.5%	216
Light Trucks	7%	185
Heavy Equipment	21%	104
Fire Equipment	8%	59
Solid Waste Packers	43%	27

Source: GEMS data for fiscal years 1997 and 1998.

We were unable to identify downtime benchmarks for heavy equipment, fire apparatus, or packers. However, we calculated the average downtime for fire apparatus in fiscal 1997 and 1998 as 16 percent, which is comparable to available downtime figures for fire apparatus in fiscal years 1991 and 1995.[12]

We also compared median labor hours to median hours out of service and downtime hours per repair. The median labor hours for sedans is two, the vehicle is in the shop for about two days, and is unavailable for one and a half work shifts. (See Exhibit 10.)

[12] *Follow-Up Audit: Fire Apparatus Management*, Office of the City Auditor, Kansas City, Missouri, May 1995, p. 22. In fiscal year 1991 the average downtime was 18 percent and in fiscal year 1995 it was 16 percent.

Exhibit 10. Comparison of Labor Hours to Hours Out of Service and Downtime by Type of Vehicle

Type of Vehicle	Median Labor Hours per Repair	Median Hours Out of Service per Repair	Median Hours Downtime per Repair	Number of Repairs
Sedans	2.0	40.97	12.07	1,915
Light Trucks	2.0	41.33	14.02	3,123
Heavy Trucks	2.5	31.10	9.58	4,421
Fire Equipment	2.0	27.02	27.02	4,379
Solid Waste Packers	3.2	32.13	10.53	2,041

Source: GEMS data for fiscal years 1997 and 1998.

Survey responses regarding timeliness were mixed. About 40 percent of the respondents made comments that timeliness could be improved and 44 percent made comments indicating that repairs were timely.

Capabilities of Fleet Management System Are Not Used

The GEMS system has the capability to track re-work, but this has not been done. The division could develop system "work flags" to indicate that the same job had been performed on a vehicle within the last 90 days when a work order is entered. A "reason for repair" code for re-work could be added to the system and service writers could use this code after checking a unit's work history for repeat repairs within 90 days when preparing work orders. Management could then run a "Reason for Repair Analysis" report from GEMS to determine the number of work orders that were for re-work or develop their own report. The GEMS system is also designed to track both maintenance and operational downtime. Management can obtain downtime performance by running the downtime tracking report that came with GEMS.

Increasing the division's use of the GEMS system's capabilities requires consistent use of detailed job codes by all staff members and promptly completing work orders when users are notified that the vehicle is ready.

Division management expressed concern that tracking re-work would increase the division's overhead. However, service writers have said that they are already reviewing vehicle work histories when they prepare work orders. It would appear that the increase in overhead caused by service writers reviewing work histories would be negligible. Management overhead would be affected even less by developing work flags that would automatically indicate that a job could be re-work.

Management should invest the necessary resources to obtain the full use of the capabilities of the GEMS system to track performance. The long term cost savings from accurate and timely management information

outweigh the short term costs of developing procedures for consistent job-coding and staff training.

Quality and Timeliness Should Be Assessed

Division management, with input from its customers, should set goals related to the quality and timeliness of work performed by the division and develop performance measures to assess progress in meeting those goals. Good fleet management practices include goals and performance measures that allow management to assess the quality of work performed and identify problem areas. Inadequate management information and failure to assess the quality of maintenance and repairs could result in or contribute to loss of customers. The division should develop and implement consistent procedures for use of GEMS and train staff to follow the procedures.

Customer satisfaction is an important measure of the quality of repairs. While the division solicited feedback from users in early 1997, the effort was halted and the division has made no effort since to survey users. The division should resume efforts to solicit feedback from users.

Internal Control Weaknesses Increase the Risk of Loss

Weak inventory controls could increase costs for users and provide opportunities for theft. The division does not have written inventory procedures, duties are not adequately segregated, and the division does not routinely provide users with itemized bills that list the parts for which they were charged. The division's last two fiscal year-end inventories disclosed significant variances between stock on hand and the amount recorded in GEMS. Nearly two thirds of the current inventory is obsolete, while the division frequently special orders parts not kept in stock. Mechanics and division management cite waiting for parts as a significant problem contributing to delays in completing repairs.

We also observed lax physical security at the Motor Equipment Division. Our visit to the Municipal Service Center garage with the city's security manager identified conditions that could potentially provide opportunities for employees or others to steal parts and equipment. Storeroom inventory and garage equipment are city investments that should be protected against the risk of loss or theft.

Significant Variances Disclosed in Year-End Inventories

Year-end inventory reports for fiscal years 1997 and 1998 disclosed a high number of discrepancies. Overall, the 1997 inventory found 12 percent of counts with discrepancies and the 1998 inventory found 18 percent of counts with discrepancies. These discrepancies are signficant. According to inventory management literature, absolute quantity differences over 10 percent are significant.[13] The highest proportion of discrepancies were at the east garage and the refuse trouble truck. Discrepancies on the 1998 inventory at these locations totaled 30 percent at east and 53 percent on the refuse trouble truck.

The division's inventory report does not reconcile beginning inventory, ending inventory, and purchases. Nor are adjustments made throughout the year considered in the final counts. So while the net dollar loss reported was relatively small, about $38,000 at the end of fiscal year 1997 and $6,400 at the end of fiscal year 1998, the actual loss could be greater. Also, the net dollar difference can be misleading as overages "cancel" losses. The absolute quantity error is a better measure of inventory control effectiveness.[14] While the net dollar loss decreased from fiscal year 1997 to 1998, the proportion of counts with errors increased.

We randomly selected 10 items to compare the quantities on hand to the quantities recorded in the system. We found discrepancies in 2 of the 10 parts selected: air compressor filters and need release filters. In each case there was one fewer in stock than recorded in inventory.

Inventory Controls Should Be Strengthened

The division does not have written policies and procedures covering inventory counts or disposition of core parts and scrap materials. Duties of storeroom staff are not adequately segregated, and mechanics are generally not required to turn in old parts. Finally, users are not routinely provided a list of parts that were included in the repair work performed.

Written procedures are needed. Although storeroom staff told us that they follow a detailed process for conducting inventory counts, the storeroom has no written procedures for taking the counts. Written procedures are needed to guide employees so that management's

[13] Robert L. Janson, *Handbook of Inventory Management* (Englewood Cliffs, NJ: Prentice-Hall, Inc., 1987), p. 163.

[14] *Handbook of Inventory Management,* p. 164.

expectations are clear. Management should develop written procedures covering all aspects of conducting inventory counts.

The year-end inventory report should reconcile beginning inventory, purchases, and ending inventory to present a more accurate picture of inventory control effectiveness. Adjustments made throughout the year should also be considered when calculating discrepancies. Significant discrepancies should be reported to the superintendent of Motor Equipment and the director of Public Works.

Duties should be segregated. The same individuals who distribute parts conduct spot checks of those items. Spot checks, in which a few items are inventoried and checked against system records, are performed about once a week, while a complete physical inventory is conducted once a year. All storeroom personnel conduct spot checks, but the request comes from storeroom management. Items selected for spot-checking are based on history and observed discrepancies. Highly visible items or parts such as tires, antifreeze, and motor oil are checked for accuracy more frequently. Proper segregation of duties requires spot checks to be conducted by individuals not in a position to dispense the item being checked.

In addition, storeroom personnel conduct the annual physical inventory count at the same location they are assigned to work daily. A better procedure would be to rotate storeroom personnel among divisions or locations to conduct the counts. This procedure would adequately segregate duties so storeroom staff responsible for dispensing and receiving inventory items does not also conduct year-end counts.

The satellite garages do not have staffed storerooms. Inventory is issued to the satellite garages and the trouble trucks from the MSC storeroom. Mechanics obtain supplies as they need them. Although these locations are included in the annual inventory, division management said that no one ensures that all parts issued to the satellite garages and trouble trucks are used in jobs or are available. The amount of inventory at these locations is not insignificant. According to the most recent year-end inventory, about 12 percent of the non-surplus inventory value is in the satellite locations. The division should periodically conduct unannounced spot checks of inventory at satellite locations.

No policies on disposition of core or scrap parts. Mechanics are generally not required to turn in old parts. Disposition of core parts (with some residual value) are not systematically tracked. There are no formal policies defining core parts or scrap and their proper disposition, although a Motor Equipment administrative directive dated 1991 reminds employees that the term "city property covers a wide range of

objects...including what some people may consider scrap or junk." The directive states that removing scrap metal from city property is theft.

The division should require mechanics to turn in old parts to the storeroom after receiving new parts and making the associated repairs. This would allow consistent disposal of core parts and scrap and provide more control over the access to parts.

Users are not routinely provided with itemized bills. The monthly billing reports provided to departments by the Public Works cost accounting section separately record costs of parts, labor, fuel, insurance, and overhead per work order but do not list the parts used. The Motor Equipment Division provides users with an itemized cost summary only upon request. The Fire Department and Solid Waste Division also request additional monthly reports. Providing itemized bills would discourage mechanics from charging departments for parts that were not installed and would help justify costs included in the bill. The division should routinely provide itemized cost summaries to users when they pick up their vehicles.

Excess Inventory Adds to Control Problems

Almost two-thirds of the inventory is not needed for the current fleet of equipment. In addition, the percentage of non-routine parts is high. Waiting for parts may delay completing repairs, contributing to user perceptions of poor timeliness.

Large surplus inventory. According to the storeroom supervisor, $410,000 of the $640,000 total inventory on hand (64%) is considered "surplus," or obsolete. About half of the surplus is for fire equipment that is no longer in the city's fleet. According to division management, much of the surplus resulted from over-buying in response to long lead times required by the city's purchasing process. Changes in purchasing may have alleviated this problem to some extent, as departments may now use "decentralized" purchase orders for purchases under $1,000. The division superintendent also said that the lack of fleet standardization contributes to difficulty in keeping the right parts on hand.

The percentage of non-routine parts is high. According to the storeroom supervisor, 15 to 20 percent of the parts ordered are not routine inventory items. Items ordered for a particular job are considered "pass-through" items. This high percentage of non-routine parts in inventory could be an indicator of potential fraud or mismanagement. Employees could be ordering parts for personal use or the storeroom may not be stocking the appropriate parts for the current fleet.

Warranties on parts may be missed. The division has no systematic method of tracking warranties on parts. If work is covered by a warranty, departments are not charged. Not identifying warranties could result in unnecessary costs for users.

Division management stated that there is no way to determine the number of jobs that require warranty work. Instead, it is up to the mechanic or supervisor to notice that a part has recently been replaced. If mechanics identify a part that should be under warranty, they take it to the storeroom for follow-up with the vendor.

GEMS 2000 offers various options for tracking warranties, which would require additional data entry. Division management does not think it is feasible to enter individual serial numbers and warranty information into the system. However, systematically tracking rework would provide a flag that a failed part may be under warranty.

Inventory should be evaluated. The surplus inventory takes up space that could be used to store parts that are needed for the current fleet of equipment. Storing needed parts could reduce time spent waiting for parts to come in. In addition, surplus parts present a risk of theft, as their loss might not be noticed since they are not needed in the division's work. The division should evaluate the items being stored, dispose of those considered obsolete, determine whether purchasing other items would decrease the number of special orders, and develop a systematic method for tracking warranties.

Physical Security Is Lax

We observed conditions at the Municipal Service Center garage that could provide opportunities for employees or others to steal parts and equipment. In general, access to the Municipal Service Center was not restricted or monitored, employee parking restrictions were not enforced, and assets were not adequately marked or secured.

According to the city's security manager, conditions at the Municipal Service Center have improved. The Public Works Department formed a security committee to identify and address security concerns at the Municipal Service Center and other locations. During our observations we noted that several of the committee's concerns regarding the Municipal Service Center and other locations had been addressed, such as fence repairs and pruning and removing vegetation along fence lines.

However, we noted a number of security weaknesses at the Municipal Service Center:

- **Access was not adequately controlled.** No guard is on-duty during the day and only one guard is on duty from 4 p.m. to 8 a.m. We observed that gates were open and access was not monitored. There are a number of entrances and exits that are not monitored. Mechanics take breaks at the same time, periodically leaving the bays deserted.

- **General disorganization.** We observed piles of debris throughout the Municipal Service Center grounds. Such disorganization gives the appearance of lax controls and provides opportunities for theft.

- **Assets were not secured.** We observed tires on the grounds that were not chained. We also observed new cars in the garage with keys in the ignition and the doors unlocked.

- **Assets were not adequately marked.** Equipment is spray painted with marks that can be easily changed or covered and not all equipment is marked.

- **Parking restrictions were not enforced.** Most employees are supposed to park in a lot outside of the fenced area. However, we observed personal vehicles parked within the garage facility fence, which could provide opportunity for employees to remove equipment from the facility without detection.

The city's security manager suggested that installing a controlled access gate would secure the perimeter of the grounds, eliminating the need to put as much emphasis on monitoring people once they have gotten onto the grounds. In addition, he proposed that the city mark assets with steel stamps and that each piece of the equipment be stamped. This would ensure that the city's property is always identifiable. The Public Works Department should continue to work with the security manager to improve security at the Municipal Service Center.

Accountability for Preventive Maintenance Should Be Strengthened

Motor Equipment Division maintenance records show that about 19 percent of the fleet did not receive any preventive maintenance in the previous year. Preventive maintenance prolongs the life of equipment, helping to ensure reliable and economic operation. Without consistent policies and procedures defining operators' responsibilities for vehicle maintenance, operators may not adequately maintain vehicles. Vehicles

may have received preventive maintenance at non-city locations, but the division does not receive records on repairs performed elsewhere. The city manager should implement an administrative regulation defining operator responsibilities. In addition, preventive maintenance notification should be improved and vehicle maintenance records should be centralized if departments purchase maintenance services elsewhere.

Preventive Maintenance Is Lacking

Records show that nearly 19 percent of vehicles did not receive any preventive maintenance in fiscal year 1997 or 1998.[15] Sedans and light trucks had the highest percentage of vehicles without preventive maintenance, while solid waste packers had the lowest. (See Exhibit 11.)

The Motor Equipment Division recommends service once every 3,000 miles or every three months for sedans and light trucks, every 4,000 miles or four months for heavy trucks, every four months for fire equipment, and every 4,000 miles or four months for solid waste packers.

Departments may not be aware that maintenance is needed. We phoned seven city divisions to ask about vehicles that had received no preventive maintenance in fiscal year 1998. Several city staff told us that the vehicles are used infrequently, so they did not think maintenance was necessary. Other staff told us that they were unaware that their vehicles had not received maintenance. Although the Motor Equipment Division has experimented with different methods of notifying departments when preventive maintenance is due, their efforts have been inconsistent.

Exhibit 11. Active Units Without Preventive Maintenance Fiscal Years 1997 and 1998

Vehicle Class	1997 Active Units	Percent w/o PM	1998 Active Units	Percent w/o PM
Sedans	237	27.4%	216	24.1%
Light Trucks 1 Ton & Less	191	14.7%	160	24.4%
Heavy Trucks	88	12.5%	90	6.7%
Fire Equipment	74	12.2%	26	3.8%
Solid Waste Packers	28	3.6%	27	0.0%
TOTALS	618	18.4%	519	18.9%

Source: GEMS data for fiscal years 1997 and 1998.

[15] We reviewed GEMS data for vehicles that had been in service a minimum of 11 months during fiscal year 1997 and fiscal 1998. We excluded vehicles categorized as "miscellaneous," "off road equipment," leased vehicles and vehicles that represented a small portion of the city fleet, such as medium trucks, tow trucks, street sweepers, buses, tractors, and fork lifts. The analysis also excludes Aviation, Parks and Recreation, Police and Water department vehicles. The 1998 decrease in active pieces of fire apparatus was because the current fire equipment fleet was not in service for a minimum of 11 months.

Some users may have obtained preventive maintenance from other city garages or the private sector. Staff from the Neighborhood and Community Services Department told us that they have taken their vehicles to the Police Department garage or Jiffy Lube because these locations are more convenient. Departments may also take leased vehicles elsewhere for maintenance. In these cases, the Motor Equipment Division's records on vehicle repairs and maintenance are incomplete. As a result, it is difficult to ensure that city vehicles are adequately maintained.

There are no citywide policies defining operator responsibilities. Mechanics report that operators have brought in vehicles that are very low on motor oil, or otherwise damaged through misuse. Although checking fluid levels is a simple way to help keep a vehicle in operating condition, there are no citywide regulations that require operators to maintain equipment assigned to them.

The Public Works and Police departments hold operators responsible for safe operation of their vehicles. The Public Works Department, for example, requires drivers or their supervisors to exercise reasonable care in the operations and maintenance of department vehicles. Drivers confirm with their signature that they have checked their vehicle's condition and that supervisor approval has been obtained when it is necessary to operate a vehicle with specifice maintenance items still unresolved. The Kansas City Police Department has a graduated policy for disciplining operators who neglect their vehicles. Repeat infractions can result in time off without pay.

Other cities encourage regular preventive maintenance using a variey of methods. Wichita Falls, Texas and Everett, Washington prorate annual maintenance charges to departments. Phoenix charges for maintenance according to vehicle type and miles driven. Damage from abuse is billed directly to departments. In New York City, gas cards are cancelled if vehicles are not brought in for preventative maintenance. Indianapolis charges for regular preventative maintenance whether the vehicle is brought in for service or not.

Consistent notification and follow-up procedures should be established. The Motor Equipment Division has placed service stickers on windshields where operators can easily view them. The stickers provide a reminder of the mileage and the time interval to the next preventive maintenance. The Motor Equipment Division has also tried sending letters and e-mail to departments to notify staff when maintenance is due. These efforts, however, have not been implemented consistently. The number of vehicles that may not be receiving

preventive maintenance suggests that these methods do not ensure that vehicles are maintained.

Accountability is needed. The city's fleet represents a significant capital investment, but without consistent policies and procedures it is at risk for premature wear, warranty loss, breakdown, and unsafe mechanical conditions. The division should develop a consistent method to alert operators and their managers when preventive maintenance is due. In addition, the city manager should develop an administrative regulation outlining operator responsibilities regarding maintenance, and sanctions that will apply if maintenance is ignored. The AR should establish a procedure for the Motor Equipment Division to obtain maintenance records on vehicles serviced elsewhere, so that vehicle maintenance and repair records are centralized and complete.

Environmental Procedures Are Consistent with Regulations and Guidelines

We reviewed the Motor Equipment Division's policies and procedures for environmental compliance and found them consistent with federal and state environmental regulations. A recent inspection conducted by the Office of Environmental Management found the Municipal Service Center 96 percent compliant with the policies and procedures detailed in the city's Environmental Compliance Manual. The inspection examined issues such as air and water quality, and chemical and waste management. We did not conduct further tests to assess whether the Motor Equipment Division is complying with applicable regulations.

Recommendations

1. The superintendent of the Motor Equipment Division should set goals related to the quality and timeliness of work and develop performance measures to assess their progress in meeting goals. The division should solicit input from users in setting goals and should periodically report performance measures to the director of Public Works.

2. The superintendent of the Motor Equipment Division should develop procedures and training to guide in the consistent use of the fleet management system to enable use of the system to reliably track performance measures.

3. The superintendent of the Motor Equipment Division should periodically survey users to assess their level of satisfaction with the cost, quality, and timeliness of maintenance and repairs.

4. The superintendent of the Motor Equipment Division should strengthen controls over inventory. At a minimum, the division should develop written policies and procedures for conducting inventory counts, with proper segregation of duties so individuals who are responsible for distributing inventory items do not conduct counts. The division should reconcile beginning and ending inventory with purchases and report significant discrepancies to the director of Public Works.

5. The superintendent of the Motor Equipment Division should work with the city's security manager to improve security over city assets. Steps should include enforcing employee parking restrictions, requiring vehicles to be locked, restricting and monitoring access to motor equipment facilities, and removing debris from facility grounds.

6. The superintendent of the Motor Equipment Division should develop procedures for disposing of obsolete inventory items.

7. The superintendent of the Motor Equipment Division should analyze the frequency of special orders for parts and determine whether specific items should be kept on hand.

8. The superintendent of the Motor Equipment Division should routinely provide itemized cost summary reports to users when they retrieve vehicles.

9. The superintendent of the Motor Equipment Division should develop written policies and procedures to track core and scrap parts.

10. The superintendent of the Motor Equipment Division should develop a method to consistently track warranties on parts.

11. The superintendent of the Motor Equipment Division should implement a consistent method to notify departments when preventive maintenance is due.

12. The city manager should define operator responsibilities for vehicle use and maintenance in an administrative regulation. The AR should specify a mechanism for reporting vehicle misuse and establish a method for keeping central maintenance

records if users purchase maintenance services from other departments or outside vendors.

Other Issues

During the course of our audit work we identified issues beyond the scope of the audit that may warrant additional work:

Fleet size and vehicle allocation. An administrative regulation requires department heads to review vehicle assignments each month to determine whether the employees assigned a vehicle still need it. However, several city staff members told us that vehicles had not received maintenance because the vehicles are rarely used, which suggests that some vehicles are not necessary. The city could probably save money by reviewing the fleet size and allocation and removing under-used vehicles from the fleet.

Depreciation charges. Vehicle depreciation charges were eliminated in the 1987 adopted budget. The city no longer funds vehicle replacement on an on-going basis. Good fleet management practices save replacement reserves to encourage replacing vehicles at a point that minimizes overall costs. If vehicle purchases must compete with other priorities in the annual budget process, replacement may be deferred, increasing costs in the long run.

Lease versus buy. The superintendent of the Motor Equipment Division expressed concern that the number of leased vehicles is increasing. Use of leases may be a response to the elimination of depreciation charges. However, leasing may not be the most cost-effective method for the city to acquire vehicles.

Consolidation of fleet maintenance activities. We, as well as outside consultants, have recommended consolidation of fleet maintenance activities in the past. We continue to think this is a good idea. The city currently operates five fleet maintenance operations. Consolidating operations could save money by reducing overhead and potentially providing a steadier workflow.

Appendix A

Survey of Motor Equipment Customers

Survey of Motor Equipment Customers

The Motor Equipment Division conducted a user survey in early 1997. The division left feedback forms in vehicles after they were serviced and collected more than 200 completed surveys. The response rate is unknown.

The surveys asked users to rate their last experience with the division's servicing or repairing their vehicle. Users were also asked to list five things that the Motor Equipment Division does well, five things that the Motor Equipment Division could do better, and provide suggestions for improvement.

The division provided us with copies of the surveys for analysis. We categorized comments that related to cost, quality, timeliness, communication, and billing, and calculated the percentage of respondents providing positive and negative comments relating to each category.

Exhibit 12. Customer Evaluation of Motor Equipment Service

Categories	Does Well	Could Do Better
Timeliness	44%	41%
Quality	36%	32%
Cost	2%	15%
Communication	24%	29%
Billing	1%	7%

Source: Motor Equipment Division Surveys.

URGENT REQUEST for INFORMATION

This is a rapid response questionnaire to enable us to evaluate MOTOR EQUIPMENT'S standing in the eyes of our customers [your vehicle users].

As you know the whole CITY is looking at better ways to serve our community and customers, so I'm sure you would like to help us in our endeavor.

Please ask every driver of a vehicle belonging to your department to answer the following and realize that a close to 100% return rate would add to the validity of our future plans. Thank you and your employee's for your assistance.

How would you rate your last experience with Motor Equipment servicing or repairing your vehicle [write a number between 1 one (indicating very poor) and 10 ten (being excellent)]_____
*Comments:*_____
_____
_____

[1] List 5 things you consider Motor Equipment collectively does well

1. _____
2. _____
3. _____
4. _____
5. _____

[2] List 5 things you think Motor Equipment could do better

1. _____
2. _____
3. _____
4. _____
5. _____

Your suggestion as to how to improve those things you mentioned in [2] above

1. _____
2. _____
3. _____
4. _____
5. _____

I operate vehicle number _____

Please return A.S.A.P. using the CITY mail system to: *Motor Equipment*
5300 Municipal Avenue
KCMO 64120

Appendix B

Average Labor Hours for the Top 20 Jobs by Shop

Exhibit 13. Heavy Equipment

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair lighting system	2.29	6.9%
Check adjust vehicle fluids, lubricants, etc.	0.91	3.5%
Jump start battery	1.43	3.5%
Repair hydraulic systems all	3.35	3.4%
Perform A level PM	3.31	2.8%
Repair brakes, all	4.23	2.7%
Check/adjust brakes, all	3.73	1.9%
Vehicle move entire unit	2.70	1.9%
Repair signal, parking, and backup lamp	1.68	1.8%
Perform C level PM	5.60	1.7%
Repair engine system (power)	2.92	1.7%
Repair hydraulic systems - coupling	4.57	1.6%
Repair special appl warning lights	2.77	1.5%
Perform B level PM	4.56	1.4%
Repair lamps-rear, tall, stop, turn, etc	1.98	1.2%
Repair cooling system	3.37	1.1%
Repair tarpaulin	3.34	1.1%
Wash unit entire unit	1.39	0.9%
Repair fuel system	2.16	0.8%
Repair mirrors	0.96	0.8%

Exhibit 14. East Garage Shop

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair special appl warning lights	1.59	4.3%
Repair lamps-rear, tail, stop, turn, etc	1.42	4.2%
Repair hydraulic systems all	3.08	4.1%
Lubricate entire unit	1.27	3.1%
Perform A level PM	1.57	2.9%
Repair Tarpaulin	2.19	2.8%
Perform B level PM	2.56	2.5%
Repair lighting system	2.95	2.5%
Perform C level PM	3.10	2.3%
Repair tire - pneumatic	0.89	2.0%
Replace tire - pneumatic	0.81	1.8%
Jump start battery	0.98	1.6%
Repair signal, parking, and backup lamp	1.22	1.5%
Repair brakes, all	1.89	1.4%
Repair tail gate assembly	1.89	1.3%
Repair engine system (power)	2.10	1.3%
Repair body, mounted	2.07	1.3%
Repair blades, plow, scrapper, buckets	34.35	1.1%
Repair customer special request	2.30	1.1%
Repair tires, tubes, liners, valves	1.06	1.1%

Exhibit 15. Solid Waste Trouble Truck

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair hydraulic systems all	2.49	39.7%
Repair lighting system	1.86	6.8%
Repair cooling system	2.43	6.3%
Repair brakes, all	2.46	5.9%
Repair engine system (power)	2.10	4.9%
Repair cab & sheet metal	1.86	3.5%
Repair hydraulic systems - coupling	2.47	2.8%
Repair battery	1.95	2.5%
Replace hydraulic systems all	2.45	2.3%
Repair fuel system	1.95	1.6%
Repair general accessories	1.23	1.3%
Repair cranking system	2.55	1.2%
Repair tank vessel - inner shell	2.30	1.2%
Repair tires, tubes, liners, valves	1.32	1.1%
Repair transmission - main, manual	2.27	1.1%
Repair mirrors	1.41	0.9%
Repair electrical accessories	2.19	0.8%
Replace battery	2.38	0.8%
Repair steering	2.25	0.6%
Jump start battery	1.50	0.5%

Exhibit 16. Solid Waste Equipment Shop

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair hydraulic systems all	3.92	10.4%
Repair lighting system	2.35	8.8%
Repair brakes, all	5.24	5.1%
Vehicle move entire unit	3.46	2.8%
Repair tires, tubes, liners, valves	1.70	2.4%
Check/adjust vehicle fluids, lubricants, etc	1.28	2.2%
Perform A level PM	5.51	2.1%
Repair hydraulic systems - coupling	4.83	1.9%
Repair cooling system	3.11	1.8%
Repair engine system (power)	2.91	1.7%
Repair cab & sheet metal	1.51	1.6%
Repair blades	3.59	1.5%
Perform make ready for service	35.45	1.4%
Check/adjust brakes, all	4.80	1.3%
Repair mirrors	1.15	1.3%
Perform B level PM	7.99	1.3%
Repair windshield wiper and washer	1.55	1.2%
Repair lamps-rear, tail, stop, turn, etc	1.99	1.2%
Perform C level PM	8.92	1.1%
Repair clearance/marker lamp	1.87	1.0%

Exhibit 17. North Garage

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair hydraulic systems all	3.32	4.2%
Repair lighting system	3.23	3.4%
Repair brakes, all	2.69	3.1%
Vehicle move entire unit	1.21	2.9%
Repair tires, tubes, liners, valves	1.96	2.9%
Check/adjust vehicle fluids, lubricants, etc	7.87	2.7%
Perform A level PM	2.69	2.4%
Repair hydraulic systems - coupling	1.21	2.0%
Repair cooling system	3.61	1.8%
Repair engine system (power)	4.01	1.8%
Repair cab & sheet metal	1.49	1.7%
Repair blades	5.95	1.7%
Perform make ready for service	1.38	1.7%
Check/adjust brakes, all	3.51	1.5%
Repair mirrors	16.14	1.4%
Perform B level PM	2.89	1.1%
Repair windshield wiper and washer	3.08	0.9%
Repair lamps-rear, tail, stop, turn, etc	14.20	0.9%
Perform C level PM	2.50	0.8%
Repair clearance/marker lamp	1.45	0.8%

Exhibit 18. Fire Trouble Trucks

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair lighting system	1.31	17.9%
Repair electrical systems	1.45	14.3%
Repair general accessories	1.35	8.9%
Repair cooling system	1.48	5.8%
Repair brakes, all	1.73	4.4%
Repair fuel system	1.64	3.6%
Repair engine system (power)	1.22	2.9%
Repair cab & sheet metal	1.33	2.5%
Repair body	1.38	2.3%
Repair charging system	1.77	2.1%
Repair fire equipment	1.63	1.8%
Repair steering	1.32	1.8%
Repair tires, tubes, liners, valves	1.04	1.5%
Replace lighting system	1.27	1.5%
Repair battery	1.62	1.3%
Install accessories group	0.69	0.9%
Install lighting system	1.34	0.9%
Repair transmission - main, manual	1.46	0.9%
Repair instruments, gauges, meters	1.22	0.9%
Check/adjust brakes, all	1.41	0.8%

Exhibit 19. Fire Equipment Shop

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Repair lighting system	4.93	10.0%
Perform make ready for service	3.78	4.1%
Check/adjust brakes, all	2.37	3.2%
Perform A level PM	6.36	2.5%
Repair cab & sheet metal	4.80	2.0%
Repair fire equipment	7.30	1.9%
Repair brakes, all	13.22	1.9%
Perform C level PM	18.78	1.9%
Vehicle move entire unit	3.82	1.8%
Perform B level PM	7.29	1.7%
Repair cooling system	6.28	1.5%
Repair engine system (power)	3.62	1.5%
Repair steering	5.11	1.2%
Repair suspension	6.02	1.2%
Wash unit entire unit	2.98	1.2%
Repair windshield wiper & washer	2.45	1.1%
Repair general accessories	8.29	1.1%
Perform brakes, all	13.78	1.0%
Repair discharge valve	9.20	0.9%
Check/adjust vehicle fluids, lubricants, etc	1.13	0.8%

Exhibit 20. Light Equipment Shop

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Perform A level PM	1.24	8.4%
Repair tires, tubes, liners, valves	1.13	7.6%
Perform C level PM	2.00	6.2%
Vehicle move entire unit	2.88	4.9%
Perform B level PM	1.38	4.8%
Drain/refill transmission, automatic	1.08	3.6%
Jump start battery	1.17	3.0%
Repair brakes, all	2.19	2.8%
Repair lighting system	1.39	2.7%
Check/adjust vehicle fluids, lubricants, etc	0.67	2.0%
Replace battery	0.96	1.8%
Inspect charging system	0.71	1.5%
Replace front brakes & drums/rotor	1.27	1.4%
Replace tires, tubes, liners, valves	1.37	1.2%
Repair cooling system	2.03	1.1%
Inspect brakes, all	0.95	1.1%
Inspect engine system (power)	1.07	1.0%
Inspect cranking system	0.85	0.9%
Replace generator/alternator	1.47	0.8%
Repair signal, parking, and backup lamp	1.04	0.8%

Exhibit 21. Body Shop

Average Labor Hours for the Top 20 Jobs by Shop		
Job Description	Hours	Percent
Install markings – vehicle	1.56	6.0%
Perform estimate for repair	1.66	4.1%
Perform make ready for service	6.23	3.8%
Repair body	7.89	3.4%
Repair tarpaulin	6.55	3.3%
Repair cab and sheet metal	11.69	2.9%
Vehicle move entire unit	3.64	2.8%
Prepare make ready for service	3.59	2.1%
Repair entire unit	19.8	1.9%
Repair cab or front door panels	10.16	1.5%
Repair blades, plow, scrapper, buckets	22.07	1.5%
Install special appl warning lights	4.85	1.4%
Install general accessories	6.75	1.4%
Repair cab or front door mechanism	3.33	1.4%
Perform collect tech spec info	1.97	1.3%
Perform customer special request	5.40	1.2%
Prepare unit for disposal	4.19	1.1%
Install safety equipment	2.73	1.0%
Weld body	12.39	1.0%
Fabricate general accessories	8.91	1.0%

Appendix C

Percentage of System Repairs Within 90 Days of Previous Repair

Exhibit 22. Percentage of System Repairs Within 90 Days of Previous Repair

System Repaired	Number of Repairs	Repairs Within 90 Days	Percent
Lighting System	5,179	3,584	69%
Sweepers - Street and Shop	288	195	68%
Hydraulic Systems	2,220	1,448	65%
Trim and Miscellaneous Hardware	528	339	64%
Electrical Accessories	981	576	59%
Winches	47	26	55%
Cab and Sheet Metal	2,668	1,241	47%
General Accessories	1,058	491	46%
Aerial Equipment	302	139	46%
Fire Equipment	604	269	45%
Brakes	3,063	1,282	42%
Tires, Tubes, Liners, Valves	2,277	966	42%
Cooling System	1,556	590	38%
Power Take Off	215	79	37%
Body, Mounted	781	286	37%
Battery	1,543	528	34%
Engine System (Power)	1,515	519	34%
Fuel System	1,126	376	33%
Expendable Items	1,149	356	31%
Heating Unit	16	5	31%
A/C Heating and Ventilation	777	227	29%
Construction Equipment	41	11	27%
Bulk Product Transfer Systems	30	8	27%
Heating and Refrigeration	23	6	26%
Steering	741	177	24%
Power Lifts	211	50	24%
Charging System	914	210	23%
Instruments, Gauges, Meters	371	82	22%
Special Applications Group	454	101	22%
Power Shaft - Power Take Off	9	2	22%
Chain Drives	30	6	20%
Mechanical Refrigeration Unit	5	1	20%
Vehicle Coupling System	167	31	19%
Cranking System	480	84	18%
Air Conditioning Group	35	6	17%
Compressor	29	5	17%
Transmission - Main, Manual	186	29	16%
Horns, Mountings and Alarms	350	57	16%
Transfer Case/PTO	66	10	15%
Transmission, Automatic	759	105	14%
Electrical Group	281	39	14%
Rings and Bolsters	7	1	14%
Wheels, Rims, Hubs and Bearings	360	48	13%
Rear Wall and Door	16	2	13%

Blowers, Conveyors and Vibrators	8	1	13%
Lines, Tubes, Hoses, Fittings	46	6	13%
Valves and Controls	16	2	13%
Trailer Frame and Support	34	4	12%
Exhaust System	488	55	11%
Engine (auxiliary)	27	3	11%
Suspension	435	44	10%
Air Intake System	62	6	10%
Pump - Product Transfer	10	1	10%
Axles - Driven, Front Steering	11	1	9%
Clutch	66	6	9%
Bodies and Vessels Group	67	6	9%
Axles - Driven, Rear	115	9	8%
Ignition System	199	16	8%
Entire Unit	6,244	460	7%
Axles, Rear	83	5	6%
Axles, Front	20	1	5%
Frame	165	8	5%
Drive Shafts	98	5	5%
Safety Devices	138	7	5%
Engine/Motor Systems	36	1	3%
Tank Vessel - Inner Shell	35	1	3%
Drive Train Group	52	1	2%
Aerodynamic Devices	5	0	0%
Automatic Chassis Lubricator	2	0	0%
Auxiliary Transmission	9	0	0%
Electric Propulsion System	2	0	0%
Multi System (40-46) Filter Kit	1	0	0%
Accessories Group	83	0	0%
Tank Vessel - Outer Jacket	6	0	0%
Safety Devices, Instruments & Gauges	5	0	0%
OVERALL	42,026	15,242	36%

Source: GEMS data for fiscal years 1997 and 1998.

Appendix D

City Manager's Response

Office of the City Manager

DATE: February 5, 1999

TO: Mark Funkhouser, City Auditor

FROM: Robert L. Collins, City Manager

SUBJECT: Response to Performance Audit Public Works Motor Equipment Division

Recommendation 12 of the above audit was "The city manager should define operator responsibilities for vehicle use and maintenance in an administrative regulation. The AR should specify a mechanism for reporting vehicle misuse and establish a method for keeping central maintenance records if users purchase maintenance services from other departments or outside vendors."

We concur with this recommendation. We are currently in the process of establishing new procedures and a system that will provide for reporting vehicle misuse. We will appoint a task committee to develop an AR that will establish written guidelines for vehicle use and maintenance and will also make department directors responsible for reporting vehicle maintenance history to Motor Equipment for use in the GEMS 2000 fleet maintenance system.

We commend the City Auditor for this audit and believe it will be very useful in improving our fleet operations.

cc: Ed Wolf

Appendix E

Public Works Director's Response

Public Works Department

DATE: February 5, 1999

TO: Mark Funkhouser, City Auditor

FROM: George E. Wolf, Jr., P.E., ACM/Director George E. Wolf, Jr.

SUBJECT: Response to Performance Audit Public Works Motor Equipment Division

Enclosed please find the response of the Public Works Department to the above referenced report. The audit team involved is to be commended for their research. Defining the scope of this project represented a truly monumental task.

This report reflects an understanding of the difficulties of maintaining and managing a fleet. We are pleased to have them presented in such a forthright manner. We are in agreement with all recommendations.

Thank you for the opportunity to get your office's advice on the Motor Equipment Division and to respond to your recommendations.

Enclosure

c: Robert Collins
Larry Frevert
William Payne

Responses to the Audit Recommendations:

1. **The superintendent of Motor Equipment Division should set goals related to the quality and timeliness of work and develop performance measures to assess their progress in meeting goals. The division should solicit input from users in setting goals and should periodically report performance measures to the director of Public Works.**

AGREE: Since this audit began, the Motor Equipment Division has set goals and identified measurements relating to the timeliness of work being performed. They will form a "Users Group" of their customers from which they can solicit input on a number of subjects, including performance and customer satisfaction.

2. **The superintendent of Motor Equipment Division should develop procedures and training to guide in the consistent use of the fleet management system to enable use of the system to reliably track performance measures.**

AGREE: The Motor Equipment Division's Garage Superintendents have started developing a guide for their Garage Supervisors to use that will give consistency in the coding of jobs.

3. **The Superintendent of the Motor Equipment Division should periodically survey users to assess their level of satisfaction with the cost, quality, and timeliness of maintenance and repairs.**

AGREE: Motor Equipment Division has examples of surveys used by other jurisdictions. They will use them to develop their own and use it to assess the level of satisfaction of their customers. They will also utilize the "Users Group" referenced above in #1.

4. **The superintendent of the Motor Equipment Division should strengthen controls over inventory. At a minimum, the division should develop written policies and procedures for conducting inventory counts, with proper segregation of duties so individuals who are responsible for distributing inventory items do not conduct counts. The division should reconcile beginning and ending inventories with purchases and report significant discrepancies to the director of Public Works.**

AGREE: Motor Equipment has drafted formal inventory instructions. They will be in place by March 1, 1999, so that they will be in force for the April 30, 1999, fiscal year end inventory. They will reconcile the beginning and ending inventories and report significant discrepancies.

5. **The superintendent of Motor Equipment Division should work with the city's security manager to improve security over city assets. Steps should include**

enforcing employee parking restrictions, requiring vehicles to be locked, restricting and monitoring access to motor equipment facilities, and removing debris from facility grounds.

AGREE: Steps have already been taken to accomplish these tasks. The new security manager has been, and continues to be, very helpful in organizing and advising on this issue.

6. **The superintendent of Motor Equipment Division should develop procedures for disposing of obsolete inventory items.**

AGREE: Steps have already been taken to accomplish this task. One employee of the storeroom operation has had his duties modified to include being our "surplus" person. He has already been in contact with manufacturers and their distributors in order to ascertain the value of these items. Several batches of items have already been sold to interested parties for more than their salvage value.

7. **The superintendent of Motor Equipment Division should analyze the frequency of special orders for parts and determine whether specific items should be kept on hand.**

AGREE: At the beginning of each month, all of the parts that were issued during the previous month are analyzed for movement and inventory stocking levels. We will also look at additional strategies to improve parts availability.

8. **The superintendent of Motor Equipment Division should routinely provide itemized cost summary reports to the users when they retrieve vehicles.**

AGREE: Motor Equipment will work through the User's Group that is being formed to try to find a satisfactory way of accomplishing this recommendation.

9. **The superintendent of Motor Equipment Division should develop and implement written policies and procedures to track core and scrap parts.**

AGREE: The storeroom does have a policy and procedure developed for cores but it has not been put into place yet. Memos have been issued in the past and procedures are in place for the return of cores to the storeroom. Also, scrap parts are either offered to and given to customers upon completion of repairs or put into the scrap metal bin. All employees are aware that the City is receiving money for the sale of scrap metal.

10. **The superintendent of Motor Equipment Division should develop a method to consistently track warranties on parts.**

AGREE: We are currently working on a procedure to accomplish this task.

11. The superintendent of Motor Equipment Division should implement a consistent method to notify departments when preventive maintenance is due.

AGREE: We are working on a procedure to accomplish this task.

12. The city manager should define operator responsibilities for vehicle use and maintenance in an administrative regulation. The A.R. should specify a mechanism for reporting misuse and establish a method for keeping central maintenance records if users purchase maintenance services from other departments or outside vendors.

AGREE: Motor Equipment has been an advocate for this recommendation for many years. In January of 1998, this type of instrument was introduced for the Public Works Department. That document can certainly be used as a first step in accomplishing this recommendation.

Centralized ownership of the assets should be returned to the fleet managers. Motor Equipment feels that it will then be possible to achieve accurate maintenance and cost figures on the vehicles.